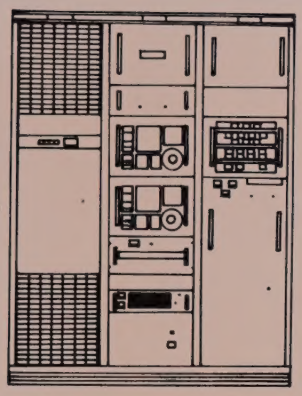
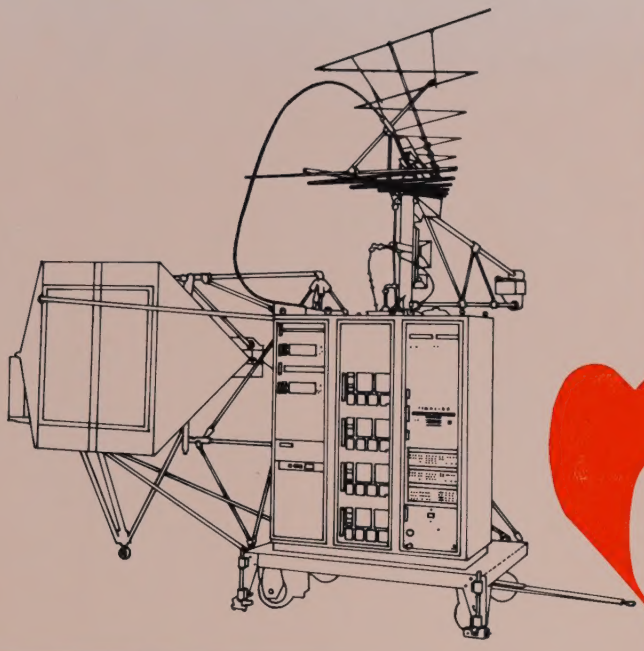




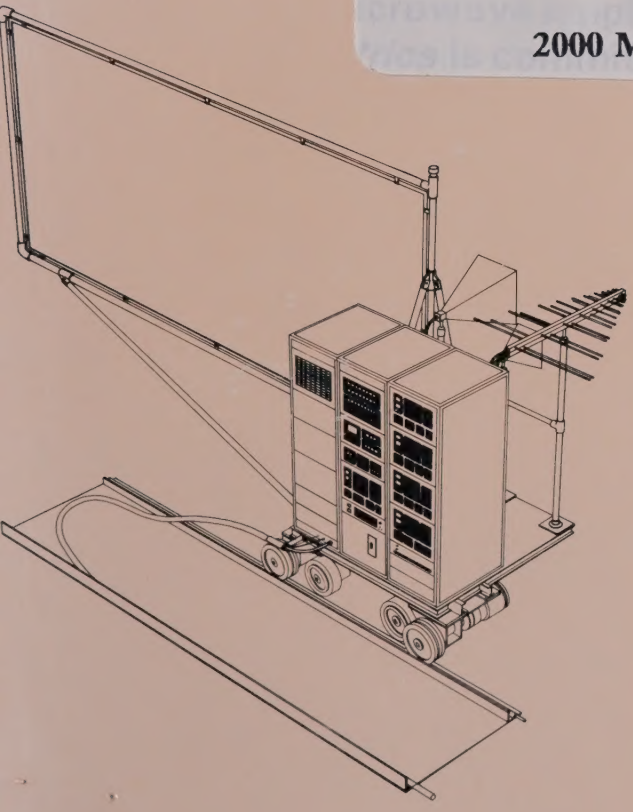
Logimetrics

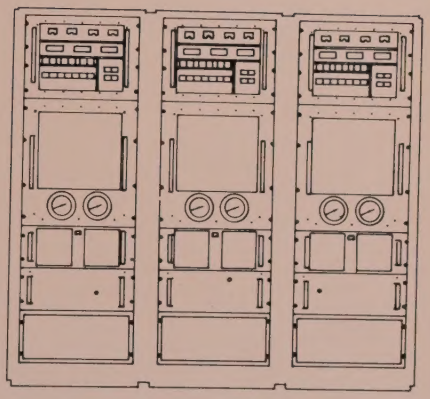
OPERATING AND SERVICE MANUAL

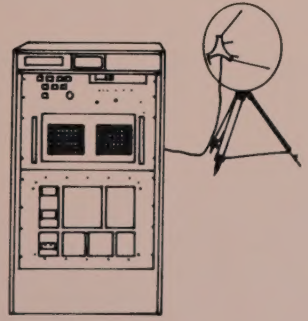
10 WATT RF POWER AMPLIFIER

MODEL A210/S-SS

2000 MHz - 4000 MHz







OPERATING AND SERVICE MANUAL

10 WATT RF POWER AMPLIFIER

MODEL A210/S-SS

2000 MHz - 4000 MHz

Prepared by:

LogiMetrics, *Inc.*

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Innovation in Instrumentation

QUALITY POLICY

LogiMetrics is a manufacturer of Traveling Wave Tube microwave amplifiers and Electronic Systems. *LogiMetrics* is committed to designing, building and assembling its products to its catalog specifications and/or to comply with special customer requirements, when specified, conforming to industry quality standards and delivery dates.

107402/07-96

RF TEST DATA

Part No. A210/S-SS

Description: 10 WATTS, 2.0 - 4.0 GHz

Customer: Motorola

Serial No. 1561

Date: 11-8-96

RF Module No. 035 & 001

Frequency (GHz)	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0
Pout @ 1dB comp. (W)	14.0	14.5	14.2	14.2	13.0	13.2	14.0	13.2	12.4	11.5	13.0
Pout @ Pi = - 3 dBm (W)	11.3	11.0	10.1	13.4	11.6	11.6	11.4	11.4	12.6	11.5	13.0
Psat (W)	15.0	17.5	17.0	15.5	15.2	15.0	16.3	15.6	14.5	13.3	15.4

Small Signal Gain Flatness ± 1.45 B

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SECTION I

GENERAL INFORMATION

1-1. SCOPE

1-2. This technical manual contains operating and servicing instructions for a 10 Watt RF power amplifier.

1-3. DESCRIPTION.

1-4. The power amplifier operates in the microwave frequency. The input to the power amplifier is a 1 mWatt nominal CW signal between 2000 MHz and 4000 MHz. The output of the power amplifier is specified at 10 Watt RF signal. Detailed specifications for the power amplifier are given in table 1-1.

Table 1-1. Specifications

Mode of Operation:	Class A Linear
Frequency Range:	2000 - 4000 MHz
Output Power @ 1 dB Compression:	10 Watt CW minimum
Output Power @ Saturation:	13 Watt CW Typical
Small Signal Gain:	41 dB minimum
Input Power:	1 mW CW nominal
Small Signal Gain Flatness:	± 1.5dB maximum
Small Signal Gain Variation:	1.5 dB maximum
Input/Output Impedance:	50 ohm nominal
Input/Output VSWR:	2:1 minimum
Input Noise Figure:	10 dB maximum
Operating Temperature Range:	0° C to 50° C
Operating Humidity Range:	95%, 0° C to 40° C
Temp. Protection:	Shut down @ 80° C minimum
Cooling system:	Forced Air
AC Power:	115 or 230VAC, 60 Hz nominal
AC Power consumption:	220 Watt maximum
Dimensions:	19.0" W x 3.47" H x 18" D
Weight:	30 Pounds maximum

SECTION II

INSTALLATION

2-1. INCOMING INSPECTION.

2-2. The power amplifier has been mechanically and electrically inspected prior to shipment. If the equipment has been damaged, or if electrical performance is not within specification, notify the carrier and LogiMetrics.

CAUTION

Do not apply power until sections 2 and 3 have been read and all specified procedures have been performed. Failure to observe this caution may result in damage to the equipment.

2-3. PREPARATION FOR USE.

2-4. CABLE FABRICATION.

2-5. The AC power cable connection is made at the rear of the unit via receptacles connector (see figure 1-2). The RF connections are made at the front panel via Type-N connectors for the RF Input and Output.

2-6. POWER REQUIREMENTS.

2-7. The power amplifier requires a power source of 115 or 230Volts AC, 60 Hertz capable of delivering 220 Watt. Turn off the front panel Power Switch before connecting the AC power source to the power amplifier.

CAUTION

For 230VAC oparation, jumper between ST1 and ST2 must be removed.
See Figure 1-3 for AC Mains Connections

2-8. LOAD REQUIREMENTS.

2-9 The power amplifier requires a load, antenna, or dummy load with a 50 Ohm impedance and a VSWR of 2 : 1. Make this external load connection before applying power.

2-10. REPACKAGING FOR SHIPMENT.

2-11. If the power amplifier is to be packaged for shipment, use the original shipping container and packing materials. If these have been discarded or are not in condition for reuse, use a heavy duty carton which will usually provide adequate protection. If the power amplifier is being returned to the manufacturer, attach an identifying tag, and indicate the cause of return.

Wrap the equipment in heavy paper or plastic, and use enough shock-absorbing material (3 to 4 inch layer) around all sides to provide a firm cushion and to prevent motion within the container. Protect the front and rear panels with cardboard or foam blocks. Seal the shipping container securely, and mark the container "FRAGILE."

SECTION III

OPERATION

3-1. INTRODUCTION

3-2. This section describes the operating controls and procedures of the power amplifier.

3-3. CONTROLS, INDICATORS AND CONNECTORS.

3-4. The indicators of the power amplifier and the RF input and output connectors are visible on the front panel. Refer to figure 1-2 and the following discussion for the location and functional description of all controls, indicators and connectors.

3-5. BASIC OPERATING PROCEDURES.

NOTE

Operation of the power amplifier is passive; that is, after Input power has been applied, no procedures other than turn off are required.

3-6. BEFORE TURN ON.

CAUTION

Do not obstruct the air flow at the front and rear of the power amplifier. Failure to maintain an unobstructed air flow may impair equipment operation.

3-7. Perform the following preliminary procedures before energizing the equipment:

a. Check that POWER switch is off.

b. At the rear of the unit, verify that the AC cord is properly inserted into the receptacle socket.

c. Verify that 50 ohm loads are connected to the RF Input and the RF Output ports.

3-8. TURN ON.

3-9. Perform the following procedures to energize the equipment:

a. Set POWER switch to the ON position. Verify POWER lamp lights.

b. Apply RF power.

CAUTION

To maintain specified performance and retain certain operating characteristics, RF power input should not exceed +3 dBm.

3-10. OPERATION.

1. POWER Switch: In the ON position, 115 or 230 Volt AC source power is applied to the power control circuits of the power amplifier.

2. POWER Lamp: Lights to indicate the distribution of AC power throughout the Power Amplifier.

3. OVER TEMPERATURE: At internal temperature of over 80°C the unit will turn off bias voltage to the main amplifiers modules, and illuminate the front panel red Fault LED. Bias will return automatically at temperatures below 75°C.

3-11. TURN OFF.

3-12. Turn off the power amplifier by lowering the RF Input drive level and by placing the ON/OFF switch in the OFF position.

SECTION IV

MAINTENANCE

4-1. INTRODUCTION.

4-2. This section describes the performance tests, adjustments, troubleshooting procedures and disassembly and reassembling procedures for the power amplifier.

4-3. PERFORMANCE TEST.

4-4. The performance test is identical to the operating procedure described in section III. When the power amplifier operates at maximum efficiency, it is operating at its optimum level.

4-5. ADJUSTMENT PROCEDURES.

4-6. There are no adjustments applicable to the power amplifier other than those normally performed at the factory.

4-7. TROUBLESHOOTING PROCEDURES.

NOTE

Troubleshooting beyond the level described by these procedures should be performed at the factory.

4-8. The following troubleshooting procedures are to be used as a guide in the localizing of an operating area. When the trouble has been localized, repair the power amplifier by replacing the defective module or component.

4-9. IMPROPER POWER DISTRIBUTION.

4-10. Power is properly distributed throughout the power amplifier when the two internal blowers are operating, the POWER lamp is lit and 115 or 230Volts AC is present. In the absence of these positive indications, perform the applicable steps of the following procedure:

a. Verify the presence of the external source power at the input of the receptacle AC connector.

b. Check that the internal blowers are operating.

c. Check Power Light.

4.11. LOW OUTPUT POWER

4-12. When the power output of the amplifier and the current drawn from the power supply are both low, the power amplifier may have triggered the thermal protection, or the main power module is defective. Perform the following procedure

a. Verify that the drive level is correct.

b. Verify that the thermal switch is ON (+13 VDC on both terminals).

4-13. NO OUTPUT POWER.

If no output power, or very low output power is indicated, and the thermal light is not lit then the main amplifier's module is defective. Replace with a new unit, and send the defective unit to the factory for repair.

Figure 1-1: Block Diagram

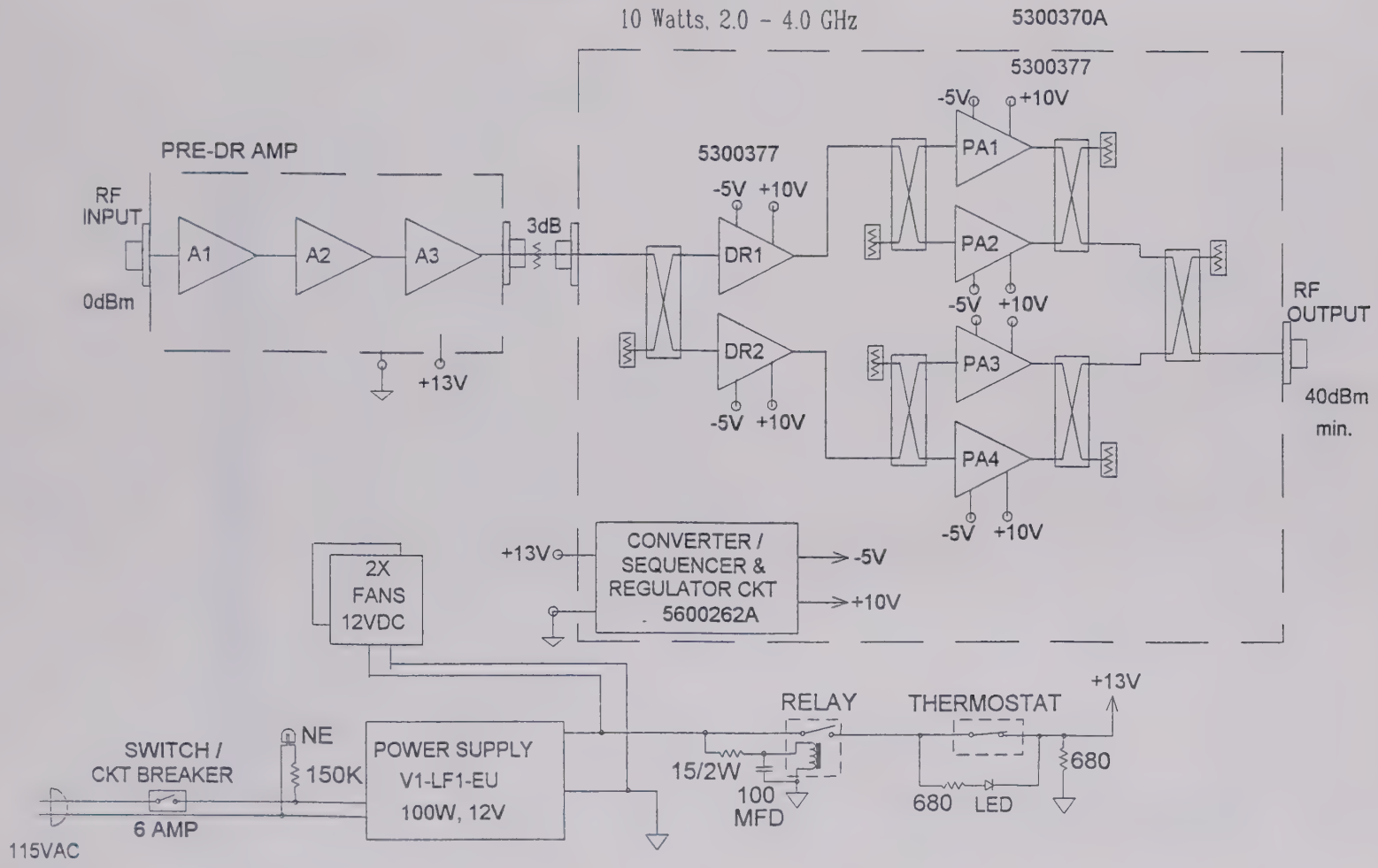


Figure 1-2. System View

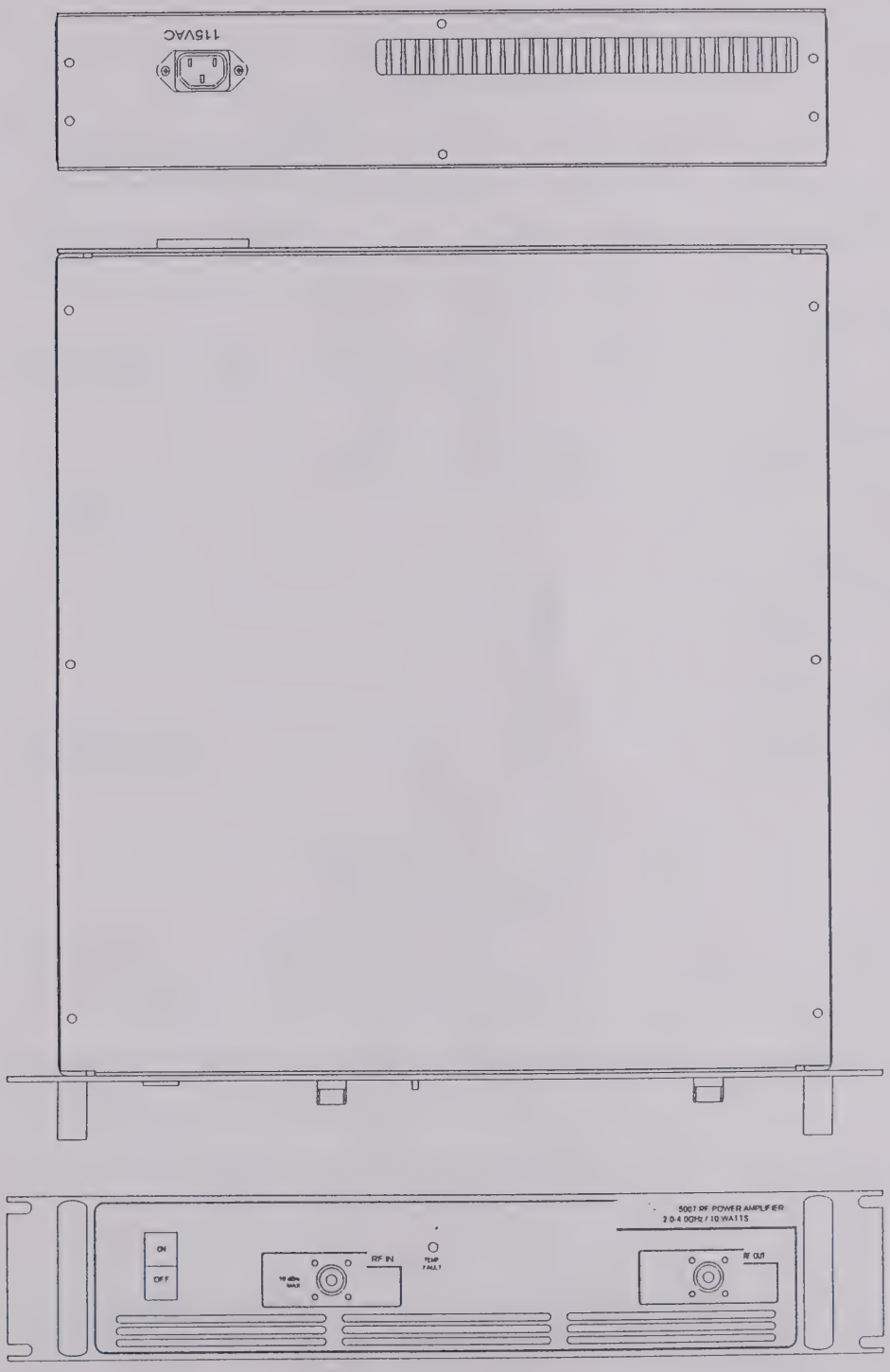
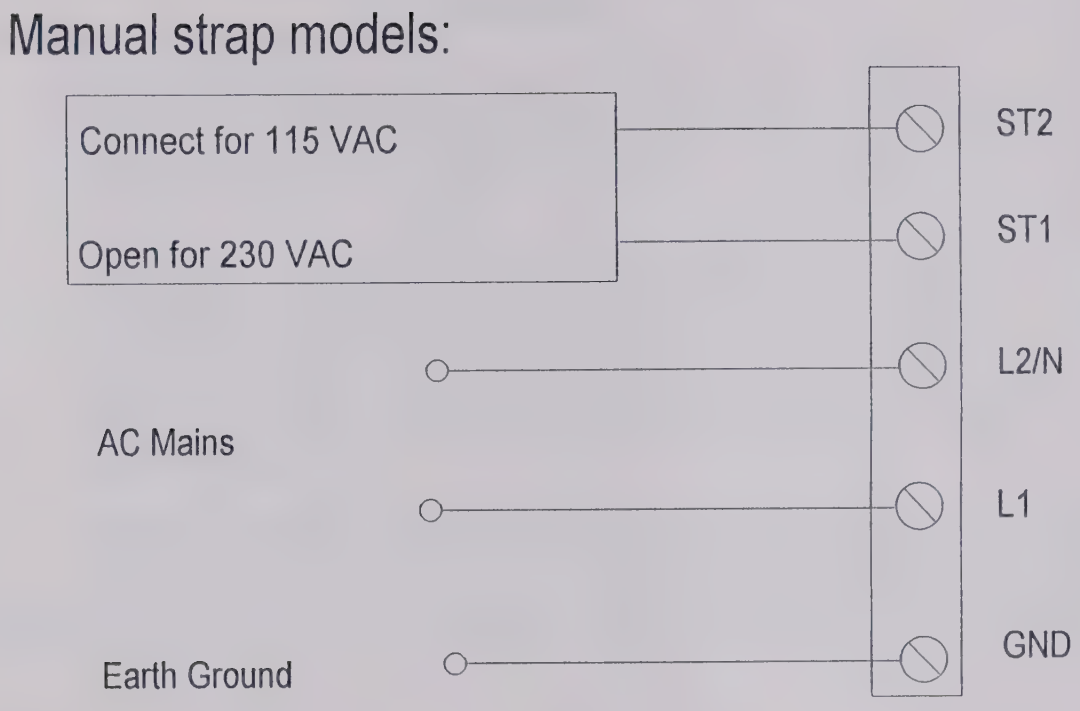


Figure 1-3. AC Mains Connections



WARRANTY

All **LogiMetrics, Inc.** products are in warranty against defects in material and workmanship for a period of one year from date of shipment and, if properly used, will perform in full accordance with their applicable specifications.

Any instrument that proves to be defective during the warranty period will be repaired, or at our option, replaced without charge. The warranty is void if the inspection seals are broken without prior written authorization from the factory. Equipment returned to the factory is to be shipped prepaid by Buyer and will be returned F.O.B. Destination. C.O.D. returns will not be accepted by our Receiving Department.

No other warranty is expressed or implied. LogiMetrics is not liable for consequential damages incurred while using its products.

CAUTION

THIS EQUIPMENT SHOULD BE SERVICED ONLY BY QUALIFIED TECHNICAL PERSONNEL.

THE INSTRUMENT CONTAINS HIGH VOLTAGE. EXTREME CARE MUST BE TAKEN TO AVOID COMING INTO CONTACT WITH ANY HIGH VOLTAGE POINT. INJURY ON CONTACT WITH HIGH VOLTAGE CAN RESULT.

LOGIMETRICS, Inc., 121-03 Dupont Street, Plainview, NY 11803
Printed in USA
11-92

WARRANTY

LIMITED WARRANTY FOR LOGIMETRICS PRODUCTS

1. WARRANTY

a. Equipment components, and subsystems (i.e., "Products"), exclusive of microwave tubes, manufactured and sold by LogiMetrics, Inc. are warranted to be free of defects in material and workmanship for a period of one (1) year except as otherwise specified on LogiMetrics quotation or agreed to in writing by LogiMetrics. LogiMetrics' obligation under all warranties is limited in accordance with the periods of time and all other conditions stated in all provisions of this warranty.

b. This warranty applies only to defects in material and workmanship in products manufactured by LogiMetrics, including non-LogiMetrics parts, except microwave tubes.

c. Microwave tubes, which are supplied as an integral part of LogiMetrics products, are warranted only in accordance with the tube manufacturer's applicable warranty.

d. Power Supplies and passive components which include electromagnets, solenoids, filters, circulators, couplers, waveguides, diplexers, and other passive devices are warranted for one (1) year of unlimited hours of operation following the date of shipment thereof, unless otherwise specified.

e. Repair, or at LogiMetrics option, replacement of the LogiMetrics product or defective parts therein shall be the sole and exclusive remedy for all valid warranty claims; provided that under certain circumstances LogiMetrics may, as an alternative, elect to refund an equitable portion of the purchase price of the product.

2. WARRANTY PERIOD

The applicable warranty period shall commence on the date of shipment from LogiMetrics to the original purchaser and extend for the stated period following the date of shipment. The warranty period for microwave tubes shall commence on the date of shipment from LogiMetrics and extend for the specified time period or number of hours of operation in accordance with the terms of the applicable express written warranty of the tube manufacturer. Upon beginning of the applicable LogiMetrics warranty period, all customer's remedies shall be governed by the terms stated or referenced in this warranty. In-warranty repaired or replacement products or parts are warranted only for the remaining unexpired portion of the original warranty period applicable to the repaired or replaced products or parts. Repair or replacement of products or parts under warranty does not extend the original warranty period.

3. WARRANTY COVERAGE LIMITATIONS

a. The following are expressly **NOT COVERED** under warranty:

1. Any loss, damage, and/or malfunction relating in any way to shipping, storage, accident, abuse, alternation, misuse, neglect, failure to use products under normal operating conditions or within respective LogiMetrics specified ratings, failure to use products according to any operating instructions provided by LogiMetrics, lack of routine care and maintenance as indicated in any operating or maintenance instructions, or failure to use or take any proper precautions under the circumstance.

2. Products, items, parts, accessories, subassemblies, or components which are expendable in normal use or are of limited life, such as but not limited to bulbs, fuses, lamps, glassware, etc.

3. Microwave tubes have a one (1) year warranty from date of shipment from LogiMetrics.

a. At LogiMetrics sole option, it may furnish warranty replacement parts to the customer before the defective part is returned to and received by LogiMetrics. If LogiMetrics furnishes such parts in advance, the customer understands and agrees that it will return the replaced defective parts to LogiMetrics within sixty (60) days after LogiMetrics advance shipment. In the event defective parts are not returned and received by LogiMetrics with this sixty (60) day period, the advance replacement parts shall be deemed not furnished under warranty and customer agrees to pay LogiMetrics invoices for all such advance shipment replacement parts at their then current selling prices.

b. LogiMetrics will not make warranty adjustments for failures of products or parts which occur after the specified warranted hours of operations or after the specified maximum adjustment period. Unless otherwise agreed, failure shall be deemed to have occurred no more than seven (7) working days before the first date on which a notice of failure is received by LogiMetrics. Under no circumstances shall any warranty exceed the period stated above unless expressly agreed to in writing by LogiMetrics. In the event customers and/or users of any LogiMetrics products subject to this warranty fail to keep accurate records of the number of hours of operation or time period of use, LogiMetrics, at its sole discretion, may reject any such claims or determine probable usage for the equipment, component, or subsystem involved.

4. LIABILITY LIMITATIONS

a. THIS WARRANTY IS EXPRESSLY IN LIEU OF AND EXCLUDES ALL OTHER EXPRESS AND IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR PARTICULAR PURPOSE, USE OR APPLICATION, AND ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF LOGIMETRICS, UNLESS SUCH OTHER WARRANTIES, OBLIGATIONS OR LIABILITIES ARE EXPRESSLY AGREED TO IN WRITING BY LOGIMETRICS.

b. All obligations of LogiMetrics under this warranty shall cease in the event its products or parts thereof have been subjected to accident, abuse, alteration, misuse or neglect, or which have not been operated and maintained in accordance with proper operating procedures.

c. IN NO EVENT SHALL LOGIMETRICS BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, SPECIAL, OR RESULTING LOSS OR DAMAGE OF ANY KIND HOWSOEVER CAUSED. LIABILITY FOR DAMAGES SHALL NOT EXCEED THE PAYMENT, IF ANY, RECEIVED BY LOGIMETRICS FOR THE UNIT OR PRODUCT OR SERVICE FURNISHED OR TO BE FURNISHED, AS THE CASE MAY BE, WHICH IS THE SUBJECT OR CLAIM OR DISPUTE.

d. No action, regardless of form, arising out of, or in any way connected with, the products, or services, furnished or to be furnished by LogiMetrics, may be brought by the customer more than one (1) year after the cause of action has accrued.

e. Statements made by any person, including representatives of LogiMetrics, which are inconsistent or in conflict with the terms of the warranty, shall not be binding upon LogiMetrics unless reduced to writing and approved by an officer of LogiMetrics.

RETURN PROCEDURES

5. WARRANTY CLAIM

All claims under warranty must be made promptly after occurrence of circumstances giving rise to the claim and must be received at LogiMetrics within the applicable warranty period. LogiMetrics reserves the right to reject any warranty claim not promptly reported. After expiration of the applicable warranty period, microwave tubes, power supplies, and components are not subject to adjustment.

6. WARRANTY INFORMATION

When a product is returned for repair and/or adjustment, a full description of the circumstances giving rise to the warranty claim should be included. Such information will help establish the cause of failure and expedite adjustment or repair.

7. TRANSPORTATION AND PACKAGING

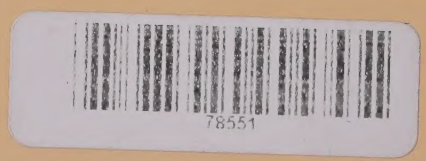
Any product returned to LogiMetrics for examination must be properly packed and sent prepaid. LogiMetrics reserves the right to reject any warranty claim on any item where seals have been broken or that has been altered in the field without written LogiMetrics authorization. Returned products should be carefully packaged in the original container, and unless otherwise indicated, shipped to:

LogiMetrics, Inc.
101-32 Dupont Street
Plainview, NY 11803
Attention: Customer Service

8. AUTHORIZATION FOR EVALUATION

When any product is returned for examination and inspection, or for any other reason, customer and its shipping agency shall be responsible for all damage resulting from improper packing or handling, and for loss in transit, notwithstanding any defect or nonconformity in the product. By returning a product, the owner grants LogiMetrics permission to open and disassemble the product as required for evaluation. In all cases LogiMetrics has sole responsibility for determining the cause and nature of failure, and LogiMetrics determination with regard thereto shall be final.

If it is found that LogiMetrics' product has been returned without cause and is still serviceable, the customer will be notified and the product returned at its expense; in addition, a charge for testing and examination will be made on the product so returned.



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